

THURSDAY, MARCH 19, 1908.

COAL MINING.

Practical Coal Mining. By Leading Experts in Mining and Engineering. Edited by W. S. Boulton. Vol. ii., pp. vi+161-348; vol. iii., pp. viii+192; vol. iv., pp. viii+193-404. (London: The Gresham Publishing Company, 1907.) Price 6s. net each.

IN NATURE of May 23, 1907, a notice was published of the first instalment of this work, which, when completed in six volumes, is intended to cover the whole ground of modern coal-mining practice. Three further volumes have been received, containing the conclusion of Prof. H. Louis' section on shaft sinking, which broke off in the middle of a paragraph, and sections on breaking ground by Mr. H. F. Bulman, on methods of working and timbering by Mr. E. H. Robertson, on haulage by Prof. G. R. Thompson, on winding by Prof. C. Latham, on pumping by Mr. W. E. Lishman, on ventilation by Mr. H. W. G. Halbaum, and on transmission of power by Mr. W. E. Lishman. This division of responsibility among many contributors renders a certain want of harmony in the treatment of the subject-matter inevitable. The work will, however, certainly prove as a whole a valuable addition to coal-mining literature.

The concluding instalment of the section on shaft sinking by Prof. H. Louis is excellent. Recent German experience of shaft sinking in difficult cases recorded by Riemer and other Continental authorities is set forth in concise form; details of cost hitherto unpublished are given, and the accompanying sixty-five illustrations, unlike most of the others in the work, have in every case an indication of the scale to which they are drawn.

The fifth section, on breaking ground, covering fifty-nine pages, contains much practical information on driving stone drifts and on coal-cutting machines. The details relating to explosives do not, however, exceed a few words, and no description is given of the rock drills employed in driving stone-drifts.

The sixth section, on methods of working and timbering, the most important branch of mining, covers only fifty-four pages, and the illustrations are not very happily chosen. Altogether this section does not compare favourably with the treatment the subjects have received in the existing treatises by Hughes, Pamey, and others.

The seventh section, on haulage, which forms the commencement of vol. iii., covers seventy-four pages, and has been carefully compiled, the information given regarding tubs, rails, haulage, roads and systems of haulage being concise, accurate, and up to date. Interesting details are furnished of the recent application of mechanical conveyors in the road leading from each working face to the level beneath in steep seams. In regular seams, not seriously disturbed by faults, much is to be hoped from the application of conveyor systems; but there will always remain a large number of mines in disturbed areas where the natural conditions preclude such systematic working, and thus

give scope to the ingenuity of the manager in arranging his system of secondary haulage.

The eighth section, on winding, covers ninety pages, and is adequate as far as it goes. Less hackneyed illustrations might have been selected with advantage, and more attention might usefully have been given to the great changes in winding that have taken place in recent years. The operating of main winding gears by electricity, for example, is dealt with in fifty lines. Winding by electricity is, it is true, little practised in Great Britain, although there is a large plant of 1500 horse-power in South Wales. In Germany, however, winding by electricity is making rapid progress. One firm alone has in hand about forty winding engines, some dealing with 2000 tons of coal per day and lifting from depths of 900 yards.

The ninth section, on pumping, covers 83 pages, and contains a concise summary of the recent literature on mine drainage, with well-selected illustrations of the principal types of pumps.

The tenth section, on ventilation, covers 80 pages, gives the principles on which the practice of mine-ventilation is based and discusses the theory of the centrifugal fan. The properties of mine gases and the instruments of measurement are also briefly dealt with.

The eleventh section, on transmission of power, deals first with electricity as the leading power agent, and then in turn with steam, compressed air, and hydraulic power. In this section various topics, such as winding, hauling, pumping, ventilation, and coal-cutting, are incidentally dealt with, the result being that there is a certain amount of clashing with previous sections. The Kaselowsky pump, for example, described on p. 403, is also described on p. 244 of the same volume.

The work is profusely illustrated, the three volumes containing 293 illustrations and twenty plates; and the type is large and clear. The ornate binding and the garish frontispieces are, perhaps, a little wanting in dignity for a comprehensive treatise on mining.

MALARIA AND NATIONAL DECAY.

Malaria. A Neglected Factor in the History of Greece and Rome. By W. H. S. Jones. With an introduction by Major R. Ross, C.B., F.R.S., and a concluding chapter by G. G. Ellett. Pp. vii+108. (Cambridge: Bowes and Bowes; London: Macmillan and Co., Ltd., 1907.) Price 2s. 6d. net.

THE subject of the rise and decline of nations and of the causes to which they are due is of perennial interest. One of the problems which historians have striven to solve is the great change in the Greek character which occurred during the fourth century B.C. To quote from Mr. Jones's essay:—

"Home life took precedence of city-life. Patriotism decayed, and lofty aspirations almost ceased to stir the hearts of men. In art there appeared a tendency to sentimentalism; philosophy in many quarters became distinctly pessimistic. Some schools of thought actually took 'absence of feeling' or 'absence of care' as the highest goal of human endeavour. Dissatisfaction and querulousness are marked charac-

teristics of the age. By 300 B.C. the Greeks had lost much of their manly vigour and intellectual strength."

In seeking for a cause for so remarkable a change the pregnant suggestion was made by Major Ross that widespread disease—particularly those "endemic diseases, which when introduced oppress a country for ever"—may have had far-reaching effects in modifying and moulding a new national character. Thus, in many of the southern States of America, the ill-health produced by widespread infection with the hook-worm has been held by American parasitologists to be largely responsible for the sloth and want of enterprise exhibited by the inhabitants of those districts. Recent investigations into the prevalence of malaria in Greece by Major Ross and others suggest that this disease may have been introduced into the country during the period mentioned, and may have been the factor bringing about this remarkable alteration of national characteristics. For malaria has not necessarily always been endemic in the districts in which it is now found. For example, Mauritius was free from malaria up to 1866, in which year it was introduced, and has caused infinite injury to the island ever since.

Mr. Jones has sought in the ancient authors for evidence which may serve to show when malaria was introduced into Greece, and what its effects may have been on the race, and has embodied the results of his researches in this interesting book. With two exceptions there seem to be no references in the classic writers to any disease which could be malaria before the middle of the fifth century B.C. It is in the "Wasps of Aristophanes" (422 B.C.) that the word *πυρετός* (used, generally in the plural, for malaria) first occurs in Greek literature (with a single exception in the "Iliad"). It is a singular coincidence that three years previously the Athenians were engaged on the island of Sphacteria, which is now one of the most malarial centres in the Mediterranean. The Peloponnesian war followed, large tracts of land were allowed to go out of cultivation, and it seems not unreasonable to conclude that the malaria parasites, introduced from Italy by Greek slaves or perhaps by the Carthaginians, then spread gradually over the country.

The word *μελαγχολία* and its cognates occur in Greek literature soon after the word *πυρετός* became common. Now the primary meaning of "melancholy" (derived from *μέλαινα χολή*, "black bile") seems to have been "excitable" or nervous. In the medical writers, tertian and quartan fevers were said to be derived from yellow and black bile respectively. Galen says that "large spleens are caused by 'melancholy humour'" (humour being used in the sense of a morbid fluid), and Hippocrates remarks that cases of "melancholy" occur in the autumn, which is the malarial season. It would therefore seem that the "melancholy" of these early writers is malarial cachexia. Mr. Jones arrives at the conclusion that "malaria was certainly prevalent in many parts of Greece, including Attica, during the fourth century B.C., though Greece was not 'highly infected,'" and

that "the change which gradually came over the Greek character from 400 B.C. onwards, was one which would certainly have been aided, and was in all probability at least partially caused by the same disease."

In a similar manner the introduction of malaria into Italy is discussed, and it is inferred that this disease did not exist there much before 200 B.C., but was prevalent from 50 B.C. onwards. It seems plausible that it was introduced by Hannibal's Carthaginian mercenaries. As in Greece, so in Rome, it left its mark on the national character:—"Malaria made the Greek weak and inefficient; it turned the sterner Roman into a blood-thirsty brute—*atra bilis* made its victims mad."

Mr. G. Ellett contributes a final chapter, and among other points directs attention to the immunity from malaria enjoyed by progressive Japan contrasted with her stagnant neighbour China, where malaria is prevalent. Major Ross's foreword describes the manner in which malaria is disseminated by the mosquito, and some of the results of malarial infection, and serves as a fitting introduction to this interesting essay, particularly for the non-medical reader. Besides being interesting, the book has been issued with an object—to show how important it is to stamp out malaria wherever possible.

R. T. II.

ELECTRICITY OLD AND NEW.

Cours d'Électricité. By H. Pellat. 3 vols. Vol. i., pp. vi+329; price 10 francs. Vol. ii., pp. 554; price 18 francs. Vol. iii., pp. vi+290; price 10 francs. (Paris: Gauthier-Villars, 1901, 1903, 1908.)

Les Découvertes modernes en Physique. By O. Manville. Pp. iii+186. (Paris: A. Hermann, 1908.) Price 5 francs.

M. PELLAT has published the courses of lectures which he gave from 1898 to 1907, covering the whole science of electricity. The first volume deals with electrostatics, the second with currents and magnetism, the third with the later developments of electrolysis and gaseous conduction. The course is intended and suited for somewhat advanced students, and no limitations are placed upon the use of mathematics; for the most part, little attention is given to experimental arrangements.

In the case of a work by a physicist so distinguished as M. Pellat it is unnecessary to criticise details; accuracy and soundness in all essentials may be assumed. The only remarks which a reviewer can offer concern the method of treatment; and it is in this respect that M. Pellat's volumes call for comment, for the order in which the subject-matter is introduced is entirely unconventional. The author believes that the usual development is illogical, and has endeavoured to correct this fault.

Thus he refuses to develop electrostatics from the basis of Coulomb's law on the ground that, if that law is taken as the starting-point, some hypothesis must be introduced, when media of different dielectric constant are considered. Accordingly he starts from experiments with a Faraday cylinder and an electrometer, and only introduces Gauss's theorem and the